# How to Check Out? An Empirical Exploration of Customers' Different Cognitive Processes in Retailing Context

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## Abstract

*Self-checkouts (SCOs) have become an integral part of many retail servicescapes. While SCOs have the potential to improve service while simultaneously cutting operations costs, achieving satisfactory utilization rates for them can be challenging. As these systems come with high investment costs, it is important for managers to understand how customers choose between traditional service and self-service technology. To understand this choice better, we study the cognitive processes consumers use in their decision-making through the lens of dual-systems theories. We conduct an exploratory field study where we observe and interview customers checking out from retail stores. We discover four distinct customer types regarding the extent of reflexive (automatic) and reflective (deliberate) processing they use in their checkout selection: habitual traditional checkout users, habitual SCO users, situational users, and drifting users. Moreover, we find that the processing styles are highly related to the different stages of technology acceptance.*

## 1. Introduction

In-store technologies are gaining prominence in retail business as stores are investing in self-service technologies (SSTs) such as self-checkouts (SCOs) in an attempt to provide augmented service environments for their customers. On the one hand, retailers hope to achieve increased sales through providing more attractive servicescapes (i.e., physical and ambient surroundings of the service delivery environment [4]), and on the other, cost savings through more effective management of staff and service demand fluctuations, and more consistent service delivery [15, 38]. At the same time, customers are enjoying ubiquitous service availability, time savings, reduction in anxiety, and increased convenience, privacy, and control [20]. Therefore, it is no wonder that SSTs have become increasingly common in service industries that have traditionally relied on personal interaction between customers and employees [18].

From the retailer's perspective, SCOs are often seen as complementary services, expanding and improving the overall service environment of the retail store. While some customers gladly welcome such additional service, others are not as convinced about their benefits and may even suspect retailers of having ulterior motives, such as plans to replace employees entirely with machines in the future. Moreover, some are uncomfortable with technology-mediated interaction or find the perceived complexity of the system as a barrier of adoption [7]. Thus, not every customer is willing to routinely use or even trial SCOs. Recent estimates suggest that SCO investment costs typically range from $115,000 to $365,000 and above [32], and that a grocery store should generate weekly sales of about $300k to ensure a reasonable payback time for such investment [13]. Moreover, payback times for SST investments are largely dependent on the continued use of the SST by customers [10]. Thus, reaching satisfactory SCO utilization rates by turning a sufficient number of customers into SCO users is paramount for retailers.

But how significant is the choice of checkout method from the customer's perspective? Considering that the primary objective of a customer entering a store is probably to collect all the necessary items and exit the store, the choice of checkout might not hold great importance in customers' minds, at least not until the point they intend to leave the store. This makes the decision to use or not to use SST a highly contextual and situational phenomenon. Consistently, previous research on SST adoption and use indicates that although customers' individual psychographic characteristics have a role in explaining the use of SSTs, situational factors like queues can be equally decisive [23, 36]. Furthermore, considering the high dynamism of the retail checkout environment, it is possible that inherent thinking styles or mere abstract perceptions about technology characteristics may not sufficiently explain the choice between traditional service and SST. Such a mundane choice may not be always based on rational reasoning, and even when consciously

URI: http://hdl.handle.net/10125/50375
ISBN: 978-0-9981331-1-9

processed, the chaotic environment in a busy retail store bombards the customer with overwhelming information and competing or contradictory cues. Indeed, building on social psychology research, Ortiz de Guinea and Markus [21] argue that we do not often even realize the effect of external and environmental stimuli on our behavior, or are overconfident of our ability to control these influences. Thus, environmental cues may have a greater effect on customer's decision-making than their judgements of their own personal and behavioral characteristics or their perceptions about the technology itself.

Although the significance of situational factors has been acknowledged, we know far less about the cognitive processes that take place in that situation. Thus, in our seek for explanations, we turn to dual-systems theories, which generally posit that people use two different types of information processing that operate in structurally distinct systems. Specifically, reflexive processes operating in System 1 are characterized as fast, automatic, non-conscious, and associative, in contrast to reflective processes in System 2 which are slow, controlled, conscious, and analytical [6, 14]. Broadly speaking, dual process theories suggest that a phenomenon can occur in two different ways, resulting from these two different processes: judgments and decisions can be made reflexively through spontaneous and effortless processing or reflectively through intentional and systematic processing [16].

We believe that looking into the cognitive processing of customers in the actual situation of making the choice may reveal further insights on the adoption of retail SSTs. Thus, we set out to investigate the following research question: *which cognitive processing types customers use when making the choice between SST and human-delivered service?* We study this in grocery retailing context where customers operate in a highly dynamic environment that burgeons with external cues and triggers. Yet, grocery shopping is a remarkably mundane activity, and SCOs tend to be easily available for customers' use. This context presents an intriguing mixture of simplicity and complexity, leaving room for the occurrence of both reflexive and reflective processing styles. To explore our question, we conduct an experimental field study by observing and interviewing customers frequenting three grocery stores that all offer both traditional service and an SCO option. We find that four customer types can be distinguished based on their cognitive processing and reasoning behind the checkout selection: habitual SCO users, habitual traditional checkout users, situational users, and drifting users.

This paper is organized as follows: in Section 2 we establish the theoretical background of this study by discussing theories of habit and dual-systems. Sections 3 and 4 report our empirical study and data analysis, respectively. In Section 5 we report our findings. Finally, Sections 6 and 7 are dedicated for discussion of our findings and implications to theory and practice, respectively.

## 2. Theoretical background

Dual-systems theories posit that human's thought processes are best represented by two discrete yet interactive systems, which we refer here to as reflexive system (that processes data automatically) and reflective system (that processes data deliberately) [14, 16]. This framework is gaining increasing traction in various disciplines, including consumer behavior research [5], and it has been suggested as a promising approach for studying information systems (IS) use phenomena as well [37]. There exist numerous configurations of dual-systems theories. While all of them generally suggest that thought processing divides into the two aforementioned types, the models differ in their interpretation and formulation of this division.

Traditional frameworks, often referred to as *dual-process theories*, include heuristic-systematic model (HSM, [6]) and elaboration likelihood model (ELM, [24]). These theories often very domain-specific and tend to present the two processing types as mutually exclusive [5]. On the contrary, more recently developed models, referred to as *dual-systems theories* [8, 14], are more integrative and generally applicable. They suggest that the two processes do not occur in isolation but are interconnected and parallel. This may manifest sequentially in a way that reflexive system feeds material to the reflective system which then corrects or filters the effects of the reflexive impulses before they materialize in actual behavior [5].

One important distinction between dual-systems theories concerns their primary focus [5] which can relate either to a) broader theory of personality, emphasizing individual characteristics [8] or b) situational behavior, highlighting the reasoning regarding a specific task [14, 29]. In essence, researchers may choose to concentrate on the characteristic processing styles tied to the decision-maker's personality or alternatively to focus on the processes immediately related to the task or choice behavior itself. One example of the former type of theory is Epstein's [8] cognitive-experiential self-theory (CEST), which suggests that people differ in the degree to which they characteristically operate in rational or experiential style. The dominance between these two systems has also situational variations, namely situational circumstances and emotional arousal which can be considered as moderating factors [9]. On the other hand, Kahneman's [14] division between System

1 and System 2 concerns the immediate task-specific processes. Finally, consumer studies that investigate self-control dilemmas tend to mix the different levels of focus [5]. For instance, Soror et al. [30] examine how a personal trait (self-regulation) interacts with a more context-specific behavior (habit).

Dual-systems theories have been applied in numerous contexts, including healthcare customers' service evaluation [27], risk attitudes of private investors [11], consumers' excessive mobile phone [30] or social media use [31], and employee acceptance of organizational systems [3]. For instance, Bhattacherjee and Sanford [3] apply ELM and find that employees' level of motivation and work expertise determine the cognitive route they use for processing information as they learn to operate a new IS. This suggests that since the potential users of the new IS are different, both types of influence processes should be utilized for achieving a higher adoption rate.

While the dual-systems approach has been utilized in various service contexts, consumer's choice between technology and human-delivered service has received less attention. As one example, Simon and Usunier [28] study the influence of personal thinking styles on the choice between technology-based service and traditional service delivery channel as they investigate how such individual cognitive differences affect the preference between SST and personal service. They find that in the case of complex services, high rational engagement and low experiential style contribute to SST preference. Vice versa, low rational engagement and high experiential style promote preference of personal service. However, the influence of the personal thinking style was found non-significant if the service is very simple, and also the situational effect of waiting time was smaller than with complex technologies.

A certain important aspect of information processing relates to habits, which can be defined as learned sequences of actions that are automatic responses to specific situations and function in attaining certain goals or end states [33]. The processing style of a certain behavior may change over time and repetition: learning to perform the behavior may require significant use of reflective processing, but once such habit has formed, it will be performed automatically using reflexive processing [1]. In this sense, sometimes automatic, reflexive behavior may originate from highly analytical reflection. When a habit has formed, it is often difficult to suppress [1, 30]. In the context of retail SST use, Wang and colleagues [35] find that customer's decision to continue SCO usage is initially rationally driven, then emotionally driven, and finally habitual. This suggests that attitude and intention alone do not always predict actual behavior exhaustively. Even though the link is strong in the initial usage phase, the impact of attitude weakens during the habit formation and is inadequate to explain behavior when the habit is formed [17, 35].

To sum up, the prior research indicates that while it is possible that individuals characteristically lean to either reflective or reflexive traits in their decision-making, such individual differences may not be able solely determine the choice between SST and personal service. Grocery shopping tends to occur in somewhat chaotic environment where, besides their individual objectives and preferences, the shopper is subjected to the influence of various environmental forces. Due to this dynamism, the retail context has certain unique features that may affect customers' reasoning in unexpected ways. Also, in such a mundane context, customers may apply a wide variety of processing types.

By examining which one of the two systems, reflexive or reflective, was dominating during such decision was made, we expect to gain a better understanding on why and how customers choose either human-delivered service or SST. Building on the past work conducted in similar settings [28], we investigate what kinds of processing styles customers use in an actual, real-life grocery shopping situation. By doing so we hope to uncover different reasoning styles that relate to distinct customer types, which may further help to explain the adoption of SSTs. To integrate such decision-making into a more holistic view on innovation adoption, we use the innovation-decision process model [26] as an additional theoretical lens. The model posits that individuals pass through five stages during the adoption of a new innovation, namely, (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. In the first two stages individuals are *exposed* to the innovation as they become aware of its existence and characteristics. This is followed by *adoption*, where the individual decides to accept (or reject, if adoption is unsuccessful) the innovation and implements this decision. Finally, the actual outcomes of innovation use are evaluated against the user's expectations, and if these are confirmed, the user has moved into the behavioral state of *continued use*. Further, it should be noted that the individual may end up *discontinuing* the innovation adoption or use at any of the abovementioned stages.

## 3. Empirical study

Earlier research on SST usage suggests that the emphasis should be on actual behavior rather than on attitude and behavioral intentions, when attempting to understand why people choose SSTs [19]. Thus, we conducted a field study in grocery stores where both SCOs and traditional checkouts were available for customers. Due to the exploratory nature of our study,

we took an interpretive approach. Our data collection methods included both non-participant observations and semi-structured interviews at the service sites. These methods were chosen because while interviewing allows one to capture customers' subjective experience of the checkout selection, observation provides the researcher with relevant situational information regarding the event. To get a permission for data collection, one of the largest grocery retailing chains in Finland was requested for cooperation. The chain gave their approval for the data collection in three of their grocery stores that had implemented SCOs, referred to as Site A, Site B, and Site C. The stores are virtually identical in terms of size and product assortment, and they are all situated in busy, central locations in the capital. Moreover, the chain also provided us chocolate bars to be given for each informant as an incentive and reward for participating in the interview. Before the field study, we interviewed the managers of Site A and Site B to gain an overall understanding of the objectives of the SCO implementation and its effect on the daily operations in the stores.

During the field study, we used the two data collection methods sequentially, starting by observing the customer and continuing with an interview. Specifically, the observation started when a customer entered the checkout area and ended after the transaction was finished and the customer was invited for an interview. The selection of informants was done randomly, however, we aimed to obtain roughly similar sized samples of informants from customers checking out through SCOs and the ones choosing traditional tills. If the observed customer did not want to be interviewed, then we counted that as a non-response event in the overall sample. The observed items were gender, shopping tool, number of shopping companions, approximate waiting time, payment method, the number of purchases, and most importantly, the chosen checkout. Additionally, an illustration of the checkout area (see Figure 1 for an example) was produced beforehand and filled according to the customer's movement, i.e. from which aisle customer enters the area and which checkout is finally selected.

Observations were complemented with one-on-one interviews which were conducted immediately after the checkout. We composed the interview form based on the existing dual-systems theories (e.g., [14]), research on SST acceptance (e.g., [36]), and relevant contextual considerations. The first objective in an interview was to find out whether the checkout selection was intuitive or deliberate (System 1/System 2). The second objective was to investigate the reasons for the selection between SCO and traditional checkout, why the other option was not selected, and intentions to use SCO in the future. We used both close-ended questions with given answers to choose from as well as open-ended ones allowing respondents to elaborate their answers. Additionally, some close-ended questions had a follow-up inquiry "why" to gain more profound understanding of the reasoning behind the answer.

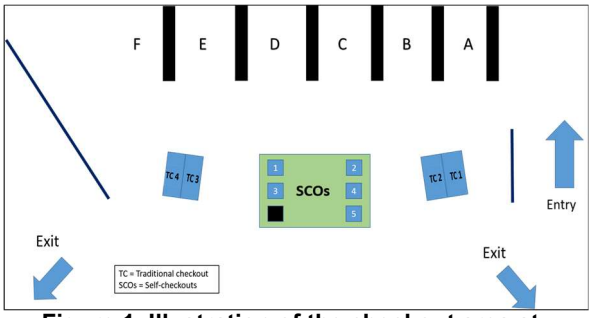


**Figure 1. Illustration of the checkout area at Site C**

To assess the validity of the questionnaire, we conducted a pilot test at Site A. In total, 17 customers agreed to take part in the pilot study. This sample consisted of 10 self-checkout users and 7 traditional checkout users. After reflecting on the conducted interviews and examining the gathered data, we revised the questionnaire into its final form so that it would better serve the objective of this study. For instance, we changed the order of some questions, revised wording, and included more options to the close-ended questions. We attempted to tap into customers' level of observation with multiple questions, for instance: *Did you observe the checkout area (e.g. waiting lines, other customers' purchases, free checkouts)?* and *Give an estimation of the extent of your observation between a range of 1-7, where 1 is minimal observation or none, and 7 is very attentive observation.* Additional questions charted the motivations for choosing the selected checkout (*Why did you choose self-checkout / traditional checkout? What are the three most important reasons and their relative importance (0-100%). Are there any other reasons?*) and whether their choice was routine like (*Your checkout selection was a) routine like b) a deviation from routines. Why?*), among several other factors.

We proceeded to the final data collection stage using the revised questionnaire at Sites A, B, and C. This resulted in a sample of 69 customer observations and interviews, of which 39 checked out using SCO and 30 used traditional service. The average age of the respondents is 38 years, ranging between 13-85 years with a standard deviation of 17.4 years. Females constitute 65 % of the sample. Most of the respondents (84 %) had tried SCO before.

## 4. Analysis

Our objective was to distinguish the types of reasoning customers used in their checkout channel selection. Along with the questions specifically designed to tap on the type of reasoning, we examined the motivations for using the selected checkout. When analyzing the data, two main motivations emerged as primary explanations for checkout selection: habit and situation. While some respondents emphasized the role of adopted routines, others highlighted environmental dynamics. Thus, we used a selected mixture of measures to deduct how customers reason their checkout selection, and based on this we categorized them into habitual and situational checkout users.

Customers in our sample divide naturally into two groups: the ones who checked out using traditional checkout and the ones who checked out using SCO. In order to classify the traditional checkout users into habitual and situational user types, we had to establish whether they have used SCO before and whether they intend to use it again. If a customer has never used SCO and checks out through traditional till at the time of interview, the customer is habitually using the traditional method. Although such customers might have intentions to try SCOs, they have not yet broken the habit of using the traditional tills. Thus, we preliminary categorized such customers into habitual traditional checkout users. Moreover, also the ones who reported having used SCOs before but had no intentions of using them again fall into the same category. They had tried SCOs but apparently did not like them and decided to stick with their incumbent habit of using the traditional tills. On the other hand, customers who report having used SCOs before and express intentions of using them again are potentially situational users. While these customers consider both checkout channels as viable options, this time they chose the traditional channel based on their reflection of the situation. Thus, we classified such customers into situational users. This initial classification was later verified (and rectified where necessary) by looking into other indicators, namely the level of observation at the checkout area and the routineness of their choice of checkout.

For self-checkout users, we established the initial division between habitual and situational users by primarily looking into their reported observation of the checkout area. The reason for choosing this metric is the fact that the SCO channels in the stores of our study are designed so that there is always one queue to the SCO area that comprises of altogether five SCO tills. The next customer in the SCO queue gets to pay at the checkout as soon as any of the five tills becomes vacant. Thus, if the customer is habitually choosing SCO without further reflections, there is no need to observe neither the SCO area nor the overall checkout area. However, if a customer reports having observed queues and other factors at the checkout area, it indicates that the customer has contemplated on whether to choose SCO or traditional checkout. As such, we classified the ones who did not observe the checkout area into habitual SCO users, and the ones who observed the area into situational users. Again, the classifications were verified by using other metrics such as routineness of checkout choice and intentions to use SCOs in the future.

The classifications were first done independently by one of the authors, a research assistant who studies consumer use of retail technologies. These were later verified by the other two authors: a doctoral student and an IS professor, both of whom do research on SST use. These independent classifications were largely consistent. A few differences that arose were found to stem from differing interpretations of customer interviews. These were resolved through discussions between the authors that lasted until an agreement over the contradictory cases was reached. Certain exceptions were made to the division principles discussed above, if this was supported by additional information provided by the customer.

## 5. Findings

Three distinct customer types emerged from our data as expected: habitual traditional checkout users, habitual SCO users, and situational users (who checked out using either traditional checkout or SCO). In addition, we discovered a fourth type whose selection behavior did not fit into our initial categories. We named this fourth type as drifting users. The resulting customer types are summarized in Table 1. Next, we discuss each customer type in detail and analyze their differences.

**Table 1: Description of the sample**

| Customer type | *n* | Average age (years ) | SCO - Traditional choice ratio | Observation at the checkout area | Most common reasons for the current checkout choice |
|---|---|---|---|---|---|
| Habitual traditional | 12 | 49.5 | 0 %-100 % | Moderate | Habit; wants to preserve cashier jobs; no prior experience of SCO; human contact |
| Habitual SCO | 11 | 41.4 | 100 %-0 % | Low | Speed of checkout; handy; usually no queue |
| Situational | 44 | 34.2 | 61 %-39 % | High | Length of the queue at the time of checking out; speed of checkout |
| Drifting | 2 | 26.5 | 50 %-50 % | Low | Happened to be near; no queue |
| Total | 69 | 37.9 | | | |

### 5.1. Habitual traditional checkout users

Most of the habitual traditional checkout users had never tried SCOs, and when asked whether they intend

to do so, their response was either "no" or "possibly". Although two of them had tried SCOs in the past, they stated not intending to use them again. Thus, most of habitual traditional checkout users have not yet broken their incumbent habit by trialing SCOs – and the ones who have done that have concluded that they prefer to stick with the traditional service. Interestingly, these customers reported moderate levels of observation (on average 4.6 out of 7, SD=2.5) at the checkout area. This can be explained by the insight that some of them were contemplating on which one of the *traditional* checkouts to choose. Additional questions about observation at the checkout area and the high standard deviation in reported observation levels lend support to this notion.

These customers expressed the most diverse set of reasons for selecting traditional checkout. Most commonly cited reasons were incumbent habit and lack of prior experience of SCO use. Moreover, these customers want effortless personal service and human contact, and they are often worried of making errors when operating them. Furthermore, many stated their concern about cashier jobs disappearing due to the emergence of technologies like SCO. Finally, habitual traditional checkout users may want to use cash and buy cigarettes, which can only be done at traditional checkout. When asked what would make them choose SCO instead, some stated that they would not use SCO in any circumstances, while others said that they might consider using SCO in the case of prohibitively long queues to the traditional checkouts.

### 5.2. Habitual SCO users

Habitual SCO users use the technology routinely whenever it is available. All such customers in our sample had prior experience of using SCOs, i.e., the time of interviewing was not their first time to use SCO. They knew that they would check out using SCO already when entering the store, and they intended to continue using the service in the future. They described their checkout selection as routine like and reported of not having observed any environmental factors in the checkout area. This was confirmed by their reported average rate of observation (1.7 out of 7, SD=0.9). The most often mentioned reason for selecting SCO was their general belief that SCOs offer speedier checkout and that they do not usually have queues. These beliefs appeared to be behind forming the habit of SCO use. Other reasons were related to convenience, privacy, control, and fun provided by SCOs. When asked, what would make them to choose traditional checkout instead, most stated that they would do that only if SCOs were not available at all or that they would have to buy something that is not available at SCO.

### 5.3. Situational users

Situational users have no predetermined checkout choices in mind when they walk into the store – instead, they make their final decision at the checkout area. These customers reported consistently high levels of observation at the checkout area (5.7 out of 7, SD=1.6), and ended up making non-routine choices more often than others. Everyone had previous experience of SCO use, except for one customer who used SCO for the first time at the time of the interview.

Not surprisingly, situational users had highly situational motives for choosing the checkout. Those who chose traditional service did that because the queue was short, they wanted to use cash, or needed to buy something that is not available at SCO (e.g. cigarettes, stamps). Those situational users who chose SCO this time mentioned short queues as the main motivation for their chose. However, the second most cited reason was the general belief that SCOs are faster. Situational users were generally willing to make a different choice of checkout than at the time of the interview if the situation would require so: both checkout alternatives were considered as viable options. Some customers in this group reported normally paying more attention to the checkout selection but this time their choice was exceptionally impulsive due to certain internal or external triggers (e.g., tiredness, shopping companion, or receiving a phone call) that inhibited the functioning of their reflective system.

### 5.4. Drifting users

Two customers reported of simply "drifting" to the closest checkout (SCO or traditional) without paying any attention to queues or other factors in the surroundings. Thus, these customers appeared surprised when prompted with questions about their checkout selection – they had not even thought about making a choice. They further emphasized that while they made no cognitive efforts to choose the optimal service option, they also do not have routine or habit of whatsoever regarding checkout selection. Instead, they end up to the nearest checkout available, no matter if it is a traditional or an SCO till. Consistently, they exhibited low levels of observation at the checkout area.

## 6. Discussion

We found occurrence of both reflexive and reflective processing of various extents in checkout selection among our sample of customers. Overall, customers can apply deliberate reasoning through high levels of reflective processing (situational users) or make the

decision entirely automatically relying on reflexive instincts (drifting users). In between these extremes are the habitual users who automatically go to either SCOs or traditional tills, and thus do not need much situational reflection regarding the choice between SST and human service due to their habit, beliefs, or attitude.

Habitual traditional checkout users exhibited a strong habit of using the traditional service, and seemed unlikely to deviate from it. Those traditional checkout users who had no prior experience in SCO use clearly exhibited inertia in technology adoption [25] – the reason for not using SCOs was, paradoxically, often reported to stem from the lack of prior SCO use. Moreover, certain beliefs and principles appear to inhibit these customers' SCO use: they value human contact in service delivery and express concerns about machines stealing humans' jobs. Due to the strong incumbent habit and/or attitudes, they did not reflect much upon the choice between SST and human service. The ones who had tried SCO in the past expressed no intentions to return using SCOs in the future, suggesting that their first trials were disappointing or unsuccessful. Regarding the choice between SST and human-delivered service, they had probably used reflective processing when deciding to trial SST but had discontinued this adoption process and reverted to automatically choosing the traditional service after the unsuccessful experience. This indicates that disenchantment discontinuance [22] may have occurred. By contrast, some customers discontinue SST use even if they would be satisfied users: one customer reported having been to intensive SCO user in the past but ever since having a baby she had returned to using traditional checkouts – using SCO while pushing a baby stroller would have been inconvenient. This represents a case of technology use discontinuance triggered by a major change in life situation [12], highlighting that situational factors may shape the technology use of individuals in myriad ways on different levels of analysis.

Similarly, incumbent habit emerged as a strong driver of habitual SCO use. While both types of customers can be described as reflexive and habitual, the origins of their habits differ drastically. Habitual SCO users have previously trialed with SCOs and adopted them, discovered the benefits and become continued users. This group demonstrates a sequential manifestation of the interaction between reflexive and reflective systems: first trials during the exposure and adoption stages have undoubtedly required some amount of reflection and deviation from routines, which has resulted in forming an automatic behavior that later operates mainly reflexively [1]. In line with Wood et al. [39], such habits require low cognitive processing, as well as little conscious attention and deliberate control.

On the contrary, situational users continuously employ reflective processing in their search of optimal solutions. While habitual users automatically selected SCO or traditional checkout (reflexive system) and had made this decision before entering the store, situational users considered both checkout alternatives and made the selection based on an evaluation of the observed situational factors at the checkout area and their current needs or preferences (reflective system). Thus, compared to habitual users who will presumably make the same checkout selection also next time, situational users' checkout selection is harder to predict as it is the product of reflective interpretation of the dynamics between environmental and internal cues. We note an interesting difference between habitual SCO users and situational users: while the former ones usually referred to their general belief of SCOs being a fast checkout method as the main motivation for selecting SCO, the latter group tended to emphasize the current queue situation at the checkout area. This distinction points out that the perceived need for cognitive processing may depend on the customer's preference between simplicity and optimization in daily life decisions. While simplifiers look for easy solutions for accomplishing a task, optimizers are willing to strive to find the best solution possible, even if that would incur additional cognitive workload or even stress [2]. It is possible that habitual SCO users are optimizers to a certain point but after a sufficient amount of reflection they prefer to solidify the most optimal mode of behavior into a routine, perhaps to save cognitive resources. On the contrary, situational users may not settle for the option that is the most optimal *on average* – instead, they remain optimizers to the very end.

# 7. Implications

Next, we provide our implications to theory and practice. In addition, we discuss the limitations of our study and propose avenues for future research.

## 7.1. Theoretical implications

To our best knowledge, this is the first study that investigates the situational dual-systems processing when choosing between technology-based and traditional service. We propose a categorization of retail customers based on their cognitive processing at the checkout area. This categorization sheds light on how customers differ in their decision-making concerning technology use. Moreover, we develop and test a novel methodology to capture this processing, that can be applied and further refined in future research. As such, we provide a fresh methodological perspective for

future studies on dual-systems processing and customer behavior.

We discover an interesting notion about the interplay between cognitive processing and routinization or automatization of behavior against the context of the general innovation adoption process [26]. Specifically, we find indication that the type of cognitive processing used is closely linked to individual's stage of technology adoption and that this link is different for each customer type. Figure 2 illustrates the different processing styles used in various stages of SCO adoption per customer type. Overall, our findings indicate that decisions made at the first stages of the technology adoption process are often processed in the reflective system. However, reflexive processing might start to dominate this decision-making at the later stages of diffusion, if the users assimilate the technology use into their routinely performed behaviors, in a way that it becomes an automatic choice. This finding was noticeable within the group of habitual SCO users who have adopted the technology and continue using it routinely. However, while most of the situational users may often choose SCO, the choice is not self-evident but a deliberate product of situational reflective processing. Moreover, the behavior of habitual traditional checkout users exhibits reflexive processing as they tend to automatically choose traditional service (although many still apply reflective processing when choosing between the traditional checkouts). Finally, certain individuals do not apply any kind of (conscious) cognitive processing but go to any checkout that is available nearby. However, we should consider the possibility that through experience they have found that neither forming a habit nor using constant optimization helps them to make better choices, and thus they have stopped using their cognitive resources for such daily dilemmas.

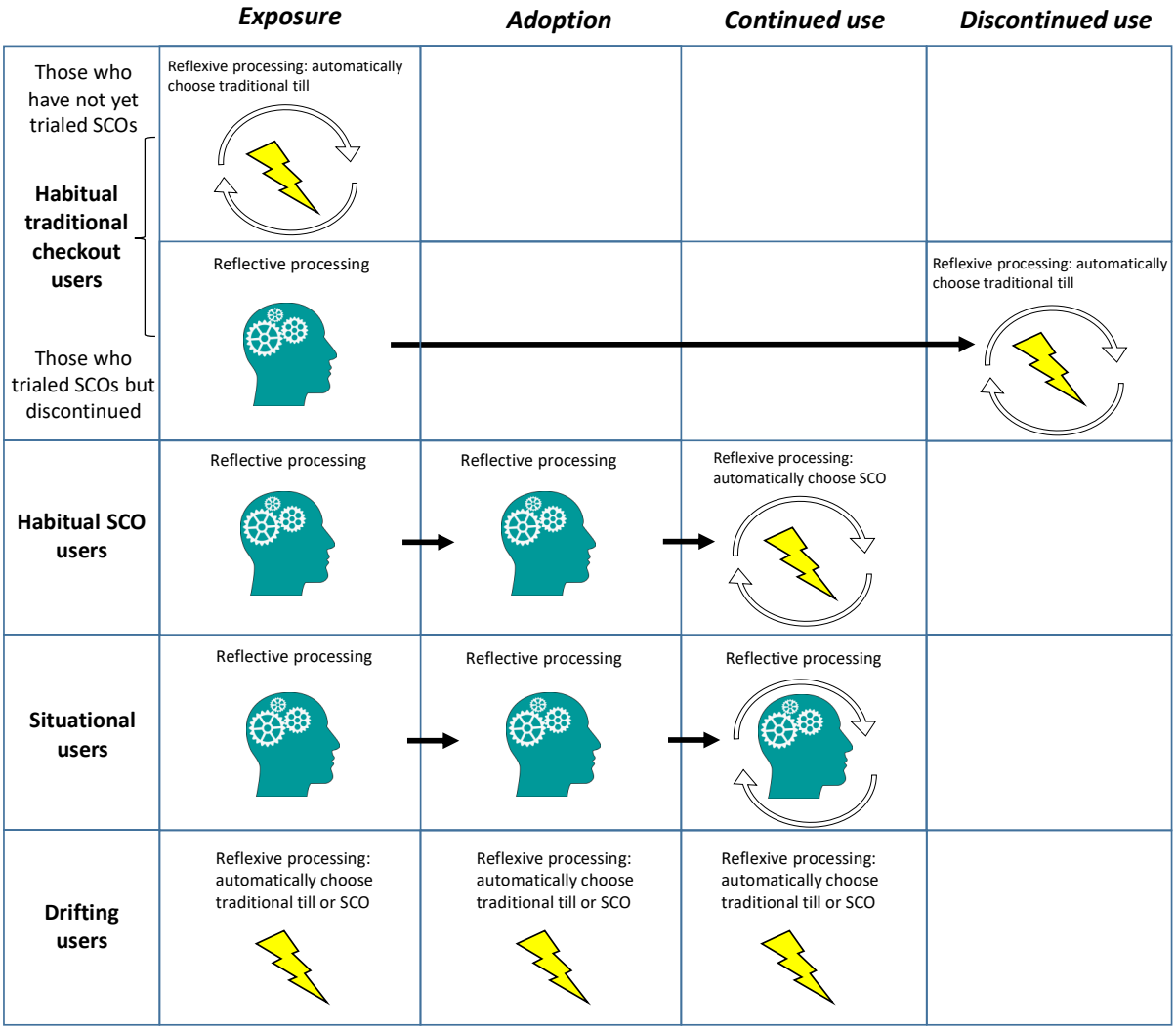


**Figure 2: Cognitive processing styles in different stages of SCO adoption**

### 7.2. Managerial Implications

Identifying customer types can help retailers to distinguish the critical issues that should be considered when implementing SSTs. Our findings highlight the importance of understanding different customer types when managing staffing and store layout. Interviews with the store managers revealed that customers' SCO utilization rates tend to be below their desired levels. The manager of Site A explained that while a satisfactory utilization rate would be at 30 %, they have remained between 25-27 % in the store. Similarly, utilization rate at Site B was reported as low as 20 %. Thus, it may be in the interests of the store management to increase the number of SCO users This could happen at least in two ways: 1) getting habitual traditional checkout users to trial SCOs, and through that turn them into situational users, and possibly later even into habitual SCO users; and 2) prompting situational and drifting users to choose SCO more often. These objectives can be advanced by occasionally increasing the number of service staff at the SCO area who can then invite people to try SCOs and provide assistance in operating them. Moreover, layout accessibility has been found to significantly affect customers' satisfaction with retail servicescape [34]. Thus, SCOs could be made more accessible through a careful design of store layout by situating them so that people are easily prompted to use them.

### 7.3. Limitations and avenues for future research

This study comes with a number of limitations that need to be addressed. First, one might assume that the customers in our sample were not in a terrible hurry during their shopping trip, since they had time to be interviewed. If this is true, our sample may be biased toward customers whose checkout selection was not affected by hurry. However, it would arguably be difficult to counter this limitation, as participating in an interview is voluntary and customers probably prioritize themselves over helping strangers in research. However, when inviting customers for interview, we tried to emphasize that the interview would be brief and that they would be contributing to an important research.

Second, although we made a significant effort to capture the customers' cognitive processing styles through informing ourselves of the existing theories on dual-systems, brainstorming different approaches to capture the reasoning process, and pilot testing the questionnaire, it can be argued that the current methodology for assessing the dominance of the two processing systems is somewhat crude and may lack some relevant components. While the currently available technology does not allow us to easily get inside of customers' heads to observe their thought processes, the applied research instrument calls for significant improvement. Further analysis of existing work on dual-systems along with our findings could help to produce a better instrument. Future research can also extend the research scope by studying the interplay of characteristic thinking styles and situational processing. This could yield a clearer overall picture of the forces that influence customers' choices.

Third, the short duration of the interviews is an issue that may limit the extent of conclusions that can be made from this study. In many cases, it could have been useful to gain more detailed elaborations about customers' motivations of the checkout selection and the extent and persistence of their habits. However, we note that persuading customers to participate for the interview real-life field setting was rather challenging even though we emphasized that the interview will be brief when approaching them. This could be circumvented by offering more tempting rewards for the participants, something that they will consider worth of their time.

Fourth, it is possible that some extent of habitual behavior is also present among situational users. They may have formed certain behavioral algorithms that are automatically triggered by environmental cues, without any extensive reflection of the situation. However, our measurement instruments were not designed to capture such complex subconscious processes, and thus we cannot make reliable conclusions about their occurrence. Finally, the small sample size may limit the generalization of the findings. Although the point of theoretical saturation was reached, new customer groups or a more refined categorization might have emerged from a larger sample.

## 8. References


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